

Air Resources Board Staff Summary of the California Climate Action Registry Power/Utilities GHG Reporting Protocol

Overview

In calendar year 2004 the electric power sector emitted roughly 110 MMT of CO₂e, representing roughly one quarter of total greenhouse gas (GHG) emissions in the California inventory provided by the California Energy Commission (CEC) in January 2007. More than half of the power-related emissions are associated with out-of-state coal power plants that sell electricity to California.

Power/utility companies produce GHG emissions in three ways: from operating large combustion facilities that burn fossil fuels (oil, coal, natural gas, etc.), from transmitting and distributing electric power, and from handling and storing fuels. The California Climate Action Registry (CCAR) has provided methodologies to calculate these emissions for voluntary reporting in the Power/Utilities Protocol (PUP).

Contents of Existing Protocol

The PUP includes the following emissions estimation methods:

Direct

- Stationary combustion (CO₂, CH₄, and N₂O emissions)
- SO₂ scrubbers (CO₂ emissions)
- Electric transmission and distribution (T&D) systems (SF₆ emissions)
- Coal handling and storage (CH₄ emissions)

Indirect

- Transmission and distribution (T&D) losses from power purchased and wheeled electricity sold (CO₂, CH₄, and N₂O emissions)

Supporting methodologies needed to complete a power entity's footprint are provided in the CCAR general reporting protocol (GRP). These include methods for estimating mobile combustion GHGs (CO₂, CH₄, N₂O), direct HFC emissions from stationary and mobile air conditioning and

refrigeration systems, direct PCF and HFC emissions from fire suppression equipment, allocating emissions from cogeneration, and indirect CO₂, CH₄, and N₂O emissions associated with the electricity, steam, or heat purchases for use by the entity itself.

The PUP requests separated reporting for non-fossil fuel generated power like the use of biomass fuels, geothermal energy, wind power, etc.

The PUP calls for three efficiency metrics and suggests several others. There is also a certification protocol provided for the power sector.

The methodologies in the PUP are consistent with the GHG Protocol Corporate Standard developed through a partnership of the WRI and the WBCSD. RGGI relies on the GHG Protocol Corporate Standard as well. The PUP methodologies are also compatible with IPCC, EU, and UK.

Methodologies and Metrics

Direct Stationary Combustion Emissions

The PUP provides two methodologies to estimate direct emissions from stationary combustion: measurement-based and fuel-based. These methods are also discussed in the GRP, although the PUP includes more refined emission factors by fuel type.

The measurement-based method uses data from Continuous Emissions Monitoring Systems (CEMS) and refers to the Code of Federal Regulations (CFR) Part 75 rule which provides protocols and procedures for operating CEMS and quantifying and reporting air pollution and CO₂ emissions to the U.S. EPA.

The fuel-based method uses a mass balance approach to determine annual fuel usage in combination with U.S. EPA default emission

factors by fuel type. The formula below is used for CO₂, CH₄, and N₂O.

The PUP calls for the separate submittal of biogenic emissions. In the case of combined fuel usage, both methods include instructions for how to separate biogenic emissions (from burning biomass) from anthropogenic emissions (from burning fossil fuels).

Direct Process Emissions

The method to estimate CO₂ from SO₂ scrubbers is based on total sorbent (tons of calcium carbonate) used.

Direct Fugitive Emissions

The PUP refers to the mass balance approach outlined in U.S. EPA SF₆ Emission Reductions Partnership for Electric Power Systems to determine SF₆ emissions associated with electric transmission and distribution. (The electric power industry uses 80 percent of SF₆ produced worldwide and circuit breaker applications account for most of these emissions.) The method to estimate CH₄ from coal handling and storage is based on coal purchase data and U.S. EPA emission factors.

Indirect Emissions from Energy Purchased/Wheeled¹

The method used to estimate GHGs from T&D losses associated with power purchased and wheeled electricity is based on data reported to the Federal Energy Regulatory Commission (FERC) in combination with emission factors for known sources of electricity or weighted factors in the

case of multiple known sources. For unknown sources, the PUP recommends the use of eGRID sub-regional emission factors.

Other Emission Sources

In order to complete an entity's carbon footprint, the PUP encourages reporting of emissions related to product shipping; employee commuting and business travel; extraction, production, and transportation of fuels used for generation of electricity, heat, or steam; purchases and sales of tradable renewable certificates; annual energy efficiency savings; and purchases and sales of GHG emission offset projects.

Efficiency Metrics

The PUP calls for three efficiency metrics and suggests five others. The three requested are shown below.

The other suggested metrics include energy output, natural gas deliveries, fuel- or facility, electricity by customer type, and natural gas by customer type.

Key Stakeholders and Leaders in Protocol Development

There are many stakeholders in the electric power sector. Investor Owned Utilities (IOUs) and Independent Power Producers (IPPs) generate the bulk of the power used in California (60 to 70%). The largest IOUs are PG&E, SCE, and SDG&E. The largest out-of-state IOUs that sell power to California are PacifiCorp and Sierra Pacific Power Co. An example of a large IPP is the Calpine Corporation. IPPs can be cogenerators,

Fuel-Based Method

$$\begin{array}{lcl} \text{Total Emissions} & = & \text{Emission Factor} \quad X \quad \text{Fuel Consumed} \quad X \quad 0.001 \\ \text{(metric tons)} & & \text{(GHG kg/MMBtu)} \quad \quad \quad \text{(MMBtu)} \quad \quad \quad \text{(metric tons/kg)} \end{array}$$

Then use IPCC global warming potential factors to convert CH₄ and N₂O to CO₂ equivalent.

¹ Wheeling is the movement of electricity from one system to another over transmission facilities of interconnecting systems.

small power producers, and other non-utility electric producers. Power producers can be “green” such as those using biomass fuels, hydro-electric, geothermal, and wind power.

Public Owned Utilities (POUs) or municipal utilities generate less than 20% of in-state generated power. The largest are SMUD and LADWP. Other sellers of electricity include electric service providers (ESPs) and community choice aggregators (CCAs) who are entitled to access the grid and deliver power directly to their customers. This process is known as “direct access”.

Other stakeholders include regulatory agencies such as the California Air Resources Board, the California Energy Commission, and the California Public Utilities Commission. Other agencies and groups with interests in power generation and distribution include the California Department of Water Resources, California Independent System Operator (ISO), environmental groups, and many more.

The workgroup formed by CCAR to develop the PUP was facilitated by M.J. Bradley & Associates and included representatives from the following:

Utilities/Power Sector

Calpine
FPL Group
PacifiCorp
Pacific Gas & Electric
SDG&E / SoCal Gas Co
SMUD

Industry Associations

Business Council for Sustainable Energy
Electric Power Research Institute

Regulatory Agencies

California Energy Commission
New York Department of Environmental Conservation

Non-government Organizations

California Climate Action Registry
Environment Defense
World Resources Institute

Efficiency Metrics

1. Total Energy Electricity Generation

Pounds of direct CO₂ emissions from stationary fossil fuel combustion for electricity generation per net megawatt hour of electricity generated from all entity-owned or –controlled electric generating facilities (i.e., fossil fuel, renewable and nuclear).

(lbs CO₂ Direct Fossil Fuel Stationary Combustion / MWh Net Generated from All Energy Sources)

2. Fossil Fuel Electricity Generation

Pounds of direct CO₂ emissions from stationary fossil fuel combustion for electricity generation per net megawatt hour of electricity generated from entity-owned or –controlled fossil-fuel fired electric generating facilities.

(lbs CO₂ Direct Fossil Fuel Stationary Combustion / MWh Net Generated from Fossil Fuel Sources Only)

3. Total Electricity Deliveries

Pounds of direct CO₂ emissions from stationary fossil fuel combustion for electricity generation and indirect CO₂ emissions from stationary fossil fuel combustion for electricity generation per net electricity generated by you and net electricity purchased from others for resale to end-users.

(lbs CO₂ Direct Stationary Fossil Fuel Combustion and Indirect Stationary Fossil Fuel Combustion / MWh Net Generated and Net Purchased from all Energy Sources).

Power/Utilities Protocol Technical Team

Air Resources Board staff are developing rules to implement the mandatory reporting requirements of AB32. Interested parties are invited to participate on a technical team that will review CCAR protocols affecting the power and utilities sector for adaptation to mandatory reporting. Those not able to participate on the technical team will be provided updates on significant issues and revisions during public workshops and on the website (below) throughout the process of finalizing the mandatory reporting program.

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